## CLAIMS

What is claimed is:

1. A method of segmenting one or more objects from one or more backgrounds in an image, the method comprising:

defining a plurality of image nodes, each said image node corresponding to one or more pixels of said image;

connecting pairs of adjacent nodes with n-links, each said n-link weighted with an n-link cost;

defining a source node;

defining a sink node;

defining one or more object seeds, said object seeds corresponding to image nodes within said objects;

defining one or more background seeds, said background seeds corresponding to image nodes within said backgrounds;

connecting said source node with each said object seed with a plurality of t-links;

connecting said sink node with each said background seed with a plurality of t-links;

wherein each said t-links is weighted with a t-link cost; and

calculating a segmentation cut having the smallest total cost of all cuts separating said source from said sink, wherein said total cost of each said cut is defined as the sum of the costs of all said n-links and t-links that each said cut severs.

2. The method of claim 1 wherein said n-link cost is a function of a local intensity gradient between said image nodes.

3. The method of claim 2 wherein said n-link cost is the function $f(|I_p-I_q|)$, where $I_p$ and $I_q$ are the intensities of image nodes p and q respectively and $f()$ is a non-negative decreasing function.

4. The method of claim 3 wherein said non-negative decreasing function $f(x) = K \bullet \exp(-x^2/\sigma^2)$.

5. The method of claim 1 wherein said t-link cost between the source and the object seeds and between the sink and the background seeds is infinity.

6. The method of claim 1 further comprising:

connecting said source node with each said image node with a plurality of t-links; and

connecting said sink node with each said image node with a plurality of t-links.

7. The method of claim 6 wherein said cost of each said t-link not connected to a seed is a function of the probability that the image node to which said t-link is connected belongs to predefined object and background distributions.

8. The method of claim 1 wherein additional seeds may be defined after calculation of said segmentation boundary and a new segmentation boundary recalculated.

9. The method of claim 8 wherein additional seeds are defined near a region where two objects

are in contact so as to separate them upon recalculation.

10. The method of claim 1 wherein said calculation of said segmentation boundary is effected with a max-flow method.

11. The method of claim 1 wherein said calculation of said segmentation boundary is effected with a push-relabel method.

12. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for segmenting one or more objects from one or more backgrounds in an image, said method steps comprising:

defining a plurality of image nodes, each said image node corresponding to one or more pixels of said image;

connecting pairs of adjacent nodes with n-links, each said n-link weighted with an n-link cost;

defining a source node;

defining a sink node;

defining one or more object seeds, said object seeds corresponding to image nodes within said objects;

defining one or more background seeds, said background seeds corresponding to image nodes within said backgrounds;

connecting said source node with each said object seed with a plurality of t-links;

connecting said sink node with each said background seed with a plurality of t-links;

wherein each said t-links is weighted with a t-link cost; and

calculating a segmentation cut having the smallest total cost of all cuts separating said source from said sink, wherein said total cost of each said cut is defined as the sum of the costs of all said n-links and t-links that each said cut severs.

13. The apparatus of claim 12 wherein said n-link cost is a function of a local intensity gradient between said image nodes.

14. The apparatus of claim 13 wherein said n-link cost is the function $f(|I_p-I_q|)$, where $I_p$ and $I_q$ are the intensities of image nodes p and q respectively and $f()$ is a non-negative decreasing function.

15. The apparatus of claim 14 wherein said non-negative decreasing function $f(x) = K \bullet \exp(-x^2/\sigma^2)$.

16. The apparatus of claim 12 wherein said t-link cost between the source and the object seeds and between the sink and the background seeds is infinity.

17. The apparatus of claim 12 further comprising:

connecting said source node with each said image node with a plurality of t-links; and

connecting said sink node with each said image node with a plurality of t-links.

18. The apparatus of claim 17 wherein said cost of each said t-link not connected to a seed is a

function of the probability that the image node to which said t-link is connected belongs to predefined object and background distributions.

19. The apparatus of claim 12 wherein additional seeds may be defined after calculation of said segmentation boundary and a new segmentation boundary recalculated.

20. The apparatus of claim 19 wherein additional seeds are defined near a region where two objects are in contact so as to separate them upon recalculation.

21. The apparatus of claim 12 wherein said calculation of said segmentation boundary is effected with a max-flow method.

22. The apparatus of claim 12 wherein said calculation of said segmentation boundary is effected with a push-relabel method.